

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 July 2000 (20.07.2000)

PCT

(10) International Publication Number
WO 00/42205 A3

(51) International Patent Classification⁷: C12N 15/82.
5/04. 15/52. 9/00. C07K 14/415, A01H 1/00

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(21) International Application Number: PCT/EP00/00246

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(22) International Filing Date: 13 January 2000 (13.01.2000)

(25) Filing Language: English

(81) Designated States (*national*): AE, AL, AM, AT, AU, AZ,
BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK,
EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN,
IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV,
MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO,
RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG,
US, UZ, VN, YU, ZA, ZW.

(26) Publication Language: English

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent
(AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent
(AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU,
MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GW, ML, MR, NE, SN, TD, TG).

(30) Priority Data:

09/232.760	15 January 1999 (15.01.1999)	US
09/237.479	26 January 1999 (26.01.1999)	US
09/244.288	3 February 1999 (03.02.1999)	US
09/252.336	18 February 1999 (18.02.1999)	US
09/281.376	30 March 1999 (30.03.1999)	US

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Published:

— With international search report.

(71) Applicant (*for AT only*): NOVARTIS-ERFINDUNGEN VERWALTUNGSGESELLSCHAFT MBH [AT/AT]; Brunner Strasse 59, A-1230 Vienna (AT).

(88) Date of publication of the international search report:
7 December 2000

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 00/42205 A3

(54) Title: HERBICIDE TARGET GENE AND METHODS

(57) Abstract: The invention relates to genes isolated from *Arabidopsis* that code for proteins essential for seedling growth. The invention also includes the methods of using these proteins to discover new herbicides, based on the essentiality of the genes for normal growth and development. The invention can also be used in a screening assay to identify inhibitors that are potential herbicides. The invention is also applied to the development of herbicide tolerant plants, plant tissues, plant seeds, and plant cells.

INTERNATIONAL SEARCH REPORT

Intern: Application No

PCT/EP 00/00246

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7	C12N15/82	C12N5/04	C12N15/52	C12N9/00	C07K14/415
	A01H1/00				

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N A01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category ³	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 162 602 A (SOMERS DAVID A ET AL) 10 November 1992 (1992-11-10) column 4, line 66 -column 6, line 56 ---	1
X	US 5 013 659 A (BEDBROOCK JOHN R ET AL) 7 May 1991 (1991-05-07) column 2, line 55 -column 4, line 2 ---	1
X	EP 0 154 204 A (MOLECULAR GENETICS INC) 11 September 1985 (1985-09-11) page 13, line 30 -page 14, line 30 ---	1
	- / --	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

³ Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date or another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

20 June 2000

04.9.00

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

Internat'l Application No
PCT/EP 00/00246

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>TOPPING JENNIFER F ET AL: "Mutations in the HYDRA1 gene of Arabidopsis perturb cell shape and disrupt embryonic and seedling morphogenesis." DEVELOPMENT (CAMBRIDGE) NOV., 1997, vol. 124, no. 21, November 1997 (1997-11), pages 4415-4424, XP000920674 ISSN: 0950-1991 the whole document</p> <p>---</p>	1
X	<p>ZHOU D -X ET AL: "COP1b, an isoform of COP1 generated by alternative splicing, has a negative effect on COP1 function in regulating light-dependent seedling development in Arabidopsis." MOLECULAR & GENERAL GENETICS FEB., 1998, vol. 257, no. 4, February 1998 (1998-02), pages 387-391, XP000920653 ISSN: 0026-8925 the whole document</p> <p>---</p>	1
X	<p>DATABASE EMBL NUCLEOTIDE AND PROTEIN SEQUENCES, 13 October 1997 (1997-10-13), XP002140496 HINXTON, GB AC = B24357. F17K7TR IGF Arabidopsis thaliana genomic clone F17K7, genomic survey sequence. abstract</p> <p>---</p>	1
A	<p>DATABASE EMBL NUCLEOTIDE AND PROTEIN SEQUENCES, 1 December 1992 (1992-12-01), XP002140497 HINXTON, GB cited in the application AC = P28353. PEPTIDE CHAIN RELEASE FACTOR 2 (RF-2). <i>Salmonella typhimurium</i>. abstract</p> <p>---</p>	1,2
A	<p>DATABASE EMBL NUCLEOTIDE AND PROTEIN SEQUENCES, 1 November 1997 (1997-11-01), XP002140498 HINXTON, GB cited in the application AC= 005782. PEPTIDE CHAIN RELEASE FACTOR 2 (RF-2). PRFB OR RV3105C OR MTCY164.15C. <i>Mycobacterium tuberculosis</i>. abstract</p> <p>---</p> <p>-/-</p>	1,2

INTERNATIONAL SEARCH REPORT

Item	Patent Application No
PCT/EP 00/00246	

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE EMBL NUCLEOTIDE AND PROTEIN SEQUENCES, 1 April 1998 (1998-04-01), XP002140499 HINXTON, GB cited in the application AC = P07012; P76642. PEPTIDE CHAIN RELEASE FACTOR 2 (RF-2). PRFB OR SUPK. Escherichia coli. abstract ---	1,2
A	DATABASE EMBL NUCLEOTIDE AND PROTEIN SEQUENCES, 1 February 1997 (1997-02-01), XP002140500 HINXTON, GB cited in the application AC = P74476. PEPTIDE CHAIN RELEASE FACTOR. PFBB. Synechocystis sp. (strain PCC 6803) abstract ---	1,2
A	ITO KOICHI ET AL: "Single amino acid substitution in prokaryote polypeptide release factor 2 permits it to terminate translation at all three stop codons." PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA JULY 7, 1998, vol. 95, no. 14, 7 July 1998 (1998-07-07), pages 8165-8169, XP002140501 ISSN: 0027-8424 cited in the application the whole document ---	1,2
A	FELDMANN K A ET AL: "A DWARF MUTANT OF ARABIDOPSIS GENERATED BY T-DNA INSERTION MUTAGENESIS" SCIENCE, U.S. AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, vol. 243, 10 March 1989 (1989-03-10), pages 1351-1354, XP002036944 ISSN: 0036-8075 the whole document ---	1
A	KONCZ ET AL: "isolation of a gene encoding a novel chloroplast protein by T-DNA tagging in Arabidopsis thaliana" EMBO JOURNAL, GB, OXFORD UNIVERSITY PRESS, SURREY, vol. 5, no. 9, 1 January 1990 (1990-01-01), pages 1337-1346, XP002076478 ISSN: 0261-4189 the whole document ---	1
		-/-

INTERNATIONAL SEARCH REPORT

Internat'l Application No

PCT/EP 00/00246

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>AZPIROZ-LEEHAN R ET AL: "T-DNA insertion mutagenesis in <i>Arabidopsis</i>: going back and forth" TRENDS IN GENETICS, NL, ELSEVIER SCIENCE PUBLISHERS B.V. AMSTERDAM, vol. 13, no. 4, 1 April 1997 (1997-04-01), pages 152-156, XP004056902 ISSN: 0168-9525 the whole document</p> <p>---</p>	
E	<p>WO 00 15809 A (NOVARTIS ERFINDUNGEN VERWALTUNG; NOVARTIS AG (CH); BUDZISZEWSKI GRE) 23 March 2000 (2000-03-23) the whole document</p> <p>-----</p>	1-46

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP 00/00246

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-46 partially

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-46 partially

An isolated DNA molecule comprising a nucleotide sequence substantially similar to SEQ.ID.N.1, wherein the sequence encodes an amino acid sequence similar to SEQ.ID.N.2 which is isolated from a plant and has "245" activity; an expression cassette; a recombinant vector; a host cell; a transformed plant; a method for obtaining shuffled sequences from SEQ.ID.N.1; a method for selecting compounds interacting with the encoded protein; inhibitors of "245" activity; a process of identifying compounds having herbicidal activity.

2. Claims: 1-46 partially

An isolated DNA molecule comprising a nucleotide sequence substantially similar to SEQ.ID.N.3, wherein the sequence encodes an amino acid sequence similar to SEQ.ID.N.4 which is isolated from a plant and has "5283" activity; an expression cassette; a recombinant vector; a host cell; a transformed plant; a method for obtaining shuffled sequences from SEQ.ID.N.3; a method for selecting compounds interacting with the encoded protein; inhibitors of "5283" activity; a process of identifying compounds having herbicidal activity.

3. Claims: 1-46 partially

An isolated DNA molecule comprising a nucleotide sequence substantially similar to SEQ.ID.N.5, wherein the sequence encodes an amino acid sequence similar to SEQ.ID.N.6 which is isolated from a plant and has "2490" activity; an expression cassette; a recombinant vector; a host cell; a transformed plant; a method for obtaining shuffled sequences from SEQ.ID.N.5; a method for selecting compounds interacting with the encoded protein; inhibitors of "2490" activity; a process of identifying compounds having herbicidal activity.

4. Claims: 1-46 partially

An isolated DNA molecule comprising a nucleotide sequence substantially similar to SEQ.ID.N.7, wherein the sequence encodes an amino acid sequence similar to SEQ.ID.N.8 which is isolated from a plant and has "3963" activity; an expression cassette; a recombinant vector; a host cell; a transformed plant; a method for obtaining shuffled sequences from SEQ.ID.N.7; a method for selecting compounds interacting with the encoded protein; inhibitors of "3963" activity; a process of identifying compounds having herbicidal activity.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

5. Claims: 1-46 partially

An isolated DNA molecule comprising a nucleotide sequence substantially similar to SEQ.ID.N.9, wherein the sequence encodes an amino acid sequence similar to SEQ.ID.N.10 which is isolated from a plant and has "4036" activity; an expression cassette; a recombinant vector; a host cell; a transformed plant; a method for obtaining shuffled sequences from SEQ.ID.N.9; a method for selecting compounds interacting with the encoded protein; inhibitors of "4036" activity; a process of identifying compounds having herbicidal activity.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internatinal Application No

PCT/EP 00/00246

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